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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/214,708	01/11/1999	MITSUMI ITANO	XI/P6217USO	8306

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EXAMINER

WINTER, GENTLE E

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 03/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/214,708

Applicant(s)

ITANO, MITSUSHI

Examiner

Gentle E. Winter

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 February 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Response to Arguments

1. Applicant's arguments have been duly considered but are not persuasive. The arguments will be addressed in turn. Applicant has submits:

Senoue fails to teach or suggest a chamber cleaning gas comprising the claimed gases. Therefore, the chamber gas must have the physical and chemical characteristics necessary for plasma CVD chamber cleaning.

2. Applicant's statement is incorrect, applicant is referred to e.g. column 2, line 20, teaching cleaning. The claimed gases are identically disclosed, see e.g. column 2, line 60.

3. Next applicant argues:

Senoue fails to teach or suggest a plasma CVD chamber cleaning gas. On the contrary, Senoue is completely silent as to a CVD chamber cleaning gas. Senoue is specifically directed to removing an etching residue or polymer from a substrate or a semiconductor material but clearly not a chamber wall. Moreover, Senoue fails to teach or suggest let alone motivate one of ordinary skill in the art to use its etching gas on the walls of a CVD chamber.

4. Applicant's statement is overlooks the fact that if the gas is in the chamber it will contact the chamber surface. Moreover, amended claim 11 places the words "CVD chamber" in the preamble and is accorded little patentable weight.

5. Applicant argues the future intended uses of claim 11:

Further evidence that the Senoue gases are used to clean a silicon substrate rather than for use in cleaning a CVD wall is provided in Senoue which clearly discloses that no contamination was observed on the surface of the substrate (Senoue, column 5, lines 20-21); no roughening or contamination was observed on the silicon substrate surface (Senoue, column 5, lines 36-37); no formation of any polymer was observed on the substrate surface (Senoue, column 5, lines 48-50); and a cleaning treatment of a semiconductor material is provided using the disclosed gas(es) (Senoue, column 6, lines 6-7).

6. Applicant appears to argue that the presently claimed invention is distinguishable because reference discloses certain characteristics, however the claims, in there present form do not appear to explicitly exclude such characteristics and in fact would inherently have the same

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characteristics, arguments drawn to limitations not found in the claims is given little patentable weight.

7. Applicant also argues

Contrary to the Examiner's allegation that the application of the gases in Senoue is used in a CVD chamber citing Senoue, column 4, line 53 *et seq.*, the cited section discloses that the etching treatment of the polysilicon layer was conducted while C_3F_8 and Cl_2 gases were introduced into the etching chamber. Thus, the Senoue's gases are used in an etching chamber, not a CVD chamber. Therefore, contrary to the Examiner's allegation, Senoue clearly teaches the use of its gases in an etching chamber and not a CVD chamber.

8. Even overlooking the arguments regarding the presence of a CVD chamber, which is clearly and explicitly disclosed, applicant has failed to indicate what differentiates a CVD chamber from an etching chamber. The chamber itself has not been claimed with any specificity and thus the only difference disclosed in the manner in which the chamber is utilized, and to a lesser extent the components *within* the chamber.

9. Applicant goes to great lengths to describe the differences between the operation of a CVD chamber and an etching chamber. These arguments are noted, but claim 11 is directed to a gas, and claim 15 is directed to a chamber cleaning method, the operation of the chamber is simply not meaningful with respect to either of the claims.

10. Applicant reiterates:

Moreover, Applicant wishes to re-emphasize and reiterate the differences between cleaning gases and etching gases.

Etching gases and cleaning gases are not interchangeable. A gas, working preferably as an etching gas, is irrelevant to a preferable cleaning gas. This is because the properties required for a cleaning gas and an etching gas are different due to their roles as previously mentioned and described in the Remarks section to the Amendment filed on March 11, 2002.

In short, a cleaning gas can just remove all byproducts formed on the chamber walls. However, an etching gas is required to have a high selectivity between what is etched and what is not etched, and a high aspect ratio. Accordingly, it is natural that a suitable cleaning gas and a suitable etching gas should be different.

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11. The argument is noted, initially, with respect to claim 11 what the gas is used for is of secondary importance. With respect to claim 15, and the differences between cleaning and etching gases, Senoue and this examiner simply do not agree with the allegation. Not all etching gases have high selectivity and not all cleaning gases "just remove all byproducts". The statement is an unsupported overgeneralization.

12. Applicant alleges:

Claims 13 and 17 were rejected under 35 U.S.C. § 102(b) as being unpatentable over Senoue in view of U.S. Patent 4,260,649 to Denison et al (hereinafter "Denison"). The Examiner alleges that every limitation of claims 13 and 17 is disclosed in Senoue except that Senoue fails to explicitly disclose a gas of hexafluoroacetone and its use as an etchant. However, the Examiner states "it is believed to be subsumed within the fluoro gas and process gases alluded to in Senoue". In addition, the Examiner points to Denison in alleging the missing element.

The Examiner mentions that Examples VI discloses that a hexafluoroacetone gas, used in conjunction with oxygen may be used to strip photoresist, and that thus Denison "teaches using the chemical of claim 17 for the purpose of claim 17 (i.e., removal of unwanted material from the plasma CVD chamber)."

Contrary to the Examiner's allegation, Denison does not teach the use of a hexafluoroacetone gas in conjunction with oxygen to strip a photoresist.

To be precise, Denison discloses that hexafluoroacetone can be used instead of CF_3I in Example I (column 4, lines 3842; please note that this paragraph is not included in Example VI). In other words, Denison discloses that selective etching of a silicon oxide layer overlaying a silicon wafer substrate workpiece is obtained by hexafluoroacetone.

13. Applicant has alleged that the examiner misrepresents what Denison teaches. Applicant then goes on to point to example I. Applicant's arguments do not comport with the reality of what Denison fairly teaches.

DETAILED ACTION

Claim Rejections - 35 USC § 102—Maintained

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 11, 12, 14-16, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by United States Patent No. 4,581,101 to Senoue et al. disclosing a “an etching gas which is capable of removing the etching residue or polymer or of efficiently preventing the formation thereof”. See e.g. column 1, line 33 *et seq.* The application of the gas is further disclosed to be in a CVD chamber see e.g. column 4, line 53 *et seq.* the addition of hexafluoropropylene oxide see e.g. column 4, line 59 and also see e.g. column 3, line 38 (disclosing that the addition of chlorine is optional, the chlorine having the effect of increasing selectivity and speed). Further the addition of oxygen, hydrogen, and nitrogen are taught as additional additives for use with the hexafluoropropylene oxide. See e.g. column 4, line 7 *et seq.* and 56-60. The invention relates to a dry etching process for forming fine patterns for semiconductor integrated circuits see e.g. column 1, line 1 *et seq.*

Claim Rejections - 35 USC § 103—Maintained

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 13 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Senoue et al. as set forth above and 4,260,649 to Dension et al. Each and every limitation of claims 13 and 17 are disclosed in Senoue et al. as set forth above, except that Senoue et al. fails to explicitly disclose the gas hexafluoroacetone and its use as an etchant, however it is believed to be subsumed within the fluoro gas and process gases alluded to in Senoue et al. In the interest of compact prosecution, and assuming that Applicant takes a contrary position, the Dension et al. reference is provided for the missing element. Examples VI discloses that a hexafluoroacetone gas, used in conjunction with oxygen may be used to strip photoresist. Thus Dension et al. teaches using the chemical of claim 17 for the purpose of claim 17 (i.e. removal of unwanted material from the plasma CVD chamber). The artisan would have made the combination in an attempt to oxidize photo resist and remove same, as explicitly set forth in Dension et al. See e.g. column 4, line 33 *et seq.*

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the

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mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

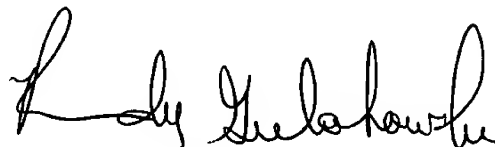
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gentle E. Winter whose telephone number is (703) 305-3403. The examiner can normally be reached on Monday-Friday 7:00-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy P. Gulakowski can be reached on (703) 308-4333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Gentle E. Winter
Examiner
Art Unit 1746

February 27, 2003

A handwritten signature in black ink, appearing to read "Randy Gulakowski", is written over a horizontal line.

RANDY GULAKOWSKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700